

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Fang et al.
SERIAL NO.: [not yet assigned]
FILING DATE: Herewith
TITLE: SUBBAND ACOUSTIC FEEDBACK CANCELLATION IN
HEARING AIDS
EXAMINER: [not yet assigned]
ART UNIT: [not yet assigned]

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Each item of information listed in the attached FORM PTO-1449 was previously submitted in U.S. Patent Application No. 10/254,698, filed on September 24, 2002, and entitled "Subband Acoustic Feedback Cancellation in Hearing Aids", the application from which this continuing application claims priority, and may be material to the examination of the above-identified application and is, therefore, submitted in compliance with the duty of disclosure defined in 37 CFR §§ 1.56, 1.97 and 1.98. The Examiner is requested to make these items of official record in this application.

This Information Disclosure Statement under 37 CFR §§ 1.56, 1.97 and 1.98 is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that any one or more of these items constitutes prior art.

I

This statement is filed pursuant to:

(X) 37 C.F.R. § 1.97(b).

This information disclosure statement is filed either (1) within three months of the filing date of a national application other than a continued prosecution application under §1.53(d); (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; (3) before the mailing date of a first office action on the merits, or (4) before the mailing of a first office action after the filing of a Request for Continued Examination under 37 C.F.R. § 1.114, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

() 37 C.F.R. § 1.97(c).

This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97 (b), but before the mailing date of either (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17 (p) for submission of an information disclosure statement under 37 C.F.R. § 1.97 (c) (\$180); or a certification according to 37 C.F.R. § 1.97 (e).

() 37 C.F.R. § 1.97(d).

This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97 (c).

Accordingly, this information disclosure statement requires the fee specified in 37 C.F.R. § 1.17 (p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d) (\$180), and a certification according to 37 C.F.R. § 1.97(e).

If this statement crosses in the mail with an office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II

- (X) No fee is due.
- () The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) is enclosed (\$180).

Please charge any additional required fee or credit any overpayment to our deposit account number 50-1698. An additional copy of this page is enclosed.

III

Pursuant to 37 C.F.R. § 1.97(e), I certify:

- (X) No certification is necessary.
- () (1) Each item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the statement.
- () (2) No item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, or, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. § 1.56(c), more than three months prior to the filing of the statement.

Respectfully submitted,
THELEN REID & PRIEST LLP



David Ritchie
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Dated: December 15, 2003

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Form PTO 1449 (Rev. 2-32) U.S. Department of Commerce Patent and Trademark Office				Atty. Docket No. SNX-036		Serial No. not yet assigned	
Information Disclosure Statement by Applicant				Applicant: Fang et al.			
(Use several sheets if necessary)				Filed: Herewith Group:			
U.S. Patent Documents							
Init.		Document No.	Date	Name	Class	Subclass	Filing Date
	A	3,578,913	05/18/71	Ufkes	179	1	05/13/68
	B	3,685,009	08/15/72	Gleming, Jr.	340	16R	06/19/70
	C	3,928,733	12/23/75	Hueber	179	107R	11/20/74
	D	4,025,721	05/24/77	Graupe et al.	179	1P	05/04/76
	E	4,061,875	12/06/77	Freifeld et al.	179	1P	02/22/77
	F	4,135,590	01/23/79	Gaulder	179	1P	07/26/76
	G	4,185,168	01/22/80	Graupe et al.	179	1P	01/04/78
	H	4,187,472	02/05/80	Yum	330	260	01/30/78
	I	4,188,667	02/12/80	Graupe et al.	364	724	11/18/77
	J	4,216,430	08/05/80	Amazawa et al.	455	219	02/21/79
	K	4,238,746	12/09/80	McCool et al.	333	166	03/20/78
	L	4,243,935	01/06/81	McCool et al.	324	77R	05/18/79
	M	4,326,172	04/20/82	Schmidt	330	294	06/26/80
	N	4,355,368	10/19/82	Zeidler et al.	364	728	10/06/80
	O	4,368,459	01/11/83	Sapora	340	407	12/16/80
	P	4,548,082	10/22/85	Engebretson et al.	73	585	08/28/84
	Q	4,589,137	05/13/86	Miller	381	94	01/03/85
	R	4,602,337	07/22/86	Cox	364	480	02/24/83
	S	4,628,529	12/09/86	Borth et al.	381	94	07/01/85
	T	4,658,426	04/14/87	Chabries et all	381	94	10/10/85
	U	4,718,099	01/05/88	Hotvet	381	68.4	01/29/86
	V	4,723,294	02/02/88	Taguchi	381	94	12/08/86
	W	4,759,071	07/19/88	Heide	381	68.4	08/14/86
	X	4,783,818	11/08/88	Graupe et al.	381	71	10/17/85
	Y	4,802,227	01/31/89	Elko et al.	381	92	04/03/87
	Z	4,912,767	03/27/90	Chang	381	47	03/14/88
	AA	4,939,685	07/03/90	Feintuch	364	724.19	12/27/89
	AB	4,956,867	09/11/90	Zurek et all	381	94.1	04/20/89
	AC	5,016,280	05/14/91	Engelbretson et al.	381	68	03/23/88
	AD	5,027,306	06/25/91	Dattorro et al.	364	724.10	05/12/89
Examiner					Date Considered		
Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.							

Form PTO 1449 (Rev. 2-32) U.S. Department of Commerce Patent and Trademark Office				Atty. Docket No. SNX-036		Serial No. [not yet assigned]	
Information Disclosure Statement by Applicant				Applicant: Fang et al.			
(Use several sheets if necessary)				Filed: Herewith Group: Unknown			
U.S. Patent Documents							
Init.		Document No.	Date	Name	Class	Subclass	Filing Date
	AE	5,091,952	02/25/92	Williamson et al.	381	68.2	11/10/88
	AF	5,097,510	03/17/92	Graupe	381	47	11/07/89
	AG	5,111,419	05/05/92	Morley Jr. et al.	364	724.19	04/11/88
	AH	5,165,017	11/17/92	Eddington et al.	381	68.4	02/23/90
	AI	5,225,836	07/06/93	Morley Jr. et al.	341	150	11/15/91
	AJ	5,233,665	08/93	Vaughn et al.	381	93	12/17/91
	AK	5,263,019	11/93	Chu	381	83	02/19/92
	AL	5,291,525	03/01/94	Funderburk et al.	375	98	04/06/92
	AM	5,305,307	04/94	Chu	381	83	02/21/91
	AN	5,355,418	10/11/94	Kelsey et al.	381	72	02/22/94
	AO	5,357,251	10/18/94	Morley, Jr. et al.	341	172	04/30/93
	AP	5,396,560	03/07/95	Arcos et al.	381	68	03/31/93
	AQ	5,402,496	03/95	Soli et al.	381	93	07/13/92
	AR	5,412,735	05/02/95	Engebretson et al.	381	94	02/27/92
	AS	5,473,684	12/05/95	Bartlett et al.	379	387	04/21/94
	AT	5,475,759	12/12/95	Engebretson	381	68.2	05/10/93
	AU	5,500,902	03/19/96	Stockham, Jr. et al.	381	68.4	07/08/94
	AV	5,511,128	04/23/96	Lindemann	381	92	01/21/94
	AW	5,651,071	07/22/97	Lindemann et al.	381	68.2	09/17/93
	AX	5,677,987	10/97	Seki et al.	395	2.35	07/18/94
	AY	5,680,467	10/97	Hansen	381	93	10/17/96
	AZ	5,689,572	11/97	Ohki et al.	381	94.1	12/08/94
	BA	5,710,820	01/20/98	Martin et al.	381	68.4	03/22/95
	BB	5,794,187	08/11/98	Franklin et al.	704	225	07/16/96
	BC	5,825,898	10/20/98	Marash	380	92	06/27/96
	BD	5,838,801	11/17/98	Ishige et al.	381	68.4	12/09/97
	BE	5,848,171	12/08/98	Stockham, Jr. et al.	381	321	01/16/96
	BF	5,867,581	02/02/99	Obara	381	312	10/11/95
	BG	6,023,517	02/08/00	Ishige	381	315	10/21/97
	BH	6,044,162	03/28/00	Mead et al.	381	312	12/20/96
	BI	6,072,885	06/06/00	Stockham, Jr. et al.	381	321	08/22/96
	BJ	6,163,287	12/19/00	Huang	341	143	04/05/99
Examiner					Date Considered		
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(Use several sheets if necessary)				Filed: Herewith Group: Unknown				
Foreign Documents								
							Translation	
Init.		Document No.	Date	Country	Class	Subclass	Yes	No
	BK	0 064 042	01/02/86	Europe	H04R 25	00	X	
	BL	0 823 829	11/2/98	Europe	H04R 25	00	X	
	BM	0 930 801	12/30/98	Europe				
	BN	96/35314	11/07/96	PCT	H04R 25	00	X	
	BO	97/50186	12/31/97	PCT				
	BP	98/28943	7/2/98	PCT	H04R 25	00	X	
	BQ	98/47227	10/22/98	PCT				
	BR	98/47314	10/22/98	PCT	H04R 25	00	X	
	BS	99/26453	05/27/99	PCT	H04R25	00	X	
Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)								
	BT	Berouti, et al., "Enhancement of Speech Corrupted by Acoustic Noise", April 1979, Proceedings of the IEEE Conference on Acoustics, Speech and Signal Processing, pp. 208-211.						
	BU	Boll, S., "Suppression of Acoustic Noise in Speech Using Spectral Subtraction," April 1979, IEEE Trans. On ASSP, Vol. ASSP-27, pp. 113-120.						
	BV	Brey, Robert H. et al., "Improvement in Speech Intelligibility in Noise Employing an Adaptive Filter with Normal and Hearing-Impaired Subjects," Journal of Rehabilitation Research and Development, Vol. 24, No. 4, pp. 75-86.						
	BW	Bustamante et al., "Measurement and Adaptive Suppression of Acoustic Feedback in Hearing Aids", Nicolet Instruments, Madison, Wisconsin, pp. 2017-2020.						
	BX	Chabries, Douglas M. et al., "Application of Adaptive Digital Signal Processing to Speech Enhancement for the Hearing Impaired," Journal of Rehabilitation Research and Development, Vol. 24, No. 4, pp. 65-74.						
	BY	Chabries, et al., "Application of a Human Auditory Model to Loudness Perception and Hearing Compensation:", 1995, IEEE, pp. 3527-3530.						
	BZ	Chabries, et al., "Noise Reduction by Amplitude Warping in the Spectral Domain in a Model-Based Algorithm", June 11, 1997, Etymotic Update, No. 15.						
	CA	Crozier, P. M. et al., "Speech Enhancement Employing Spectral Subtraction and Linear Predictive Analysis," 1993, Electronic Letters, 29(12): 1094-1095.						
	CB	"Delta-Sigma Overview", Fall 1996, ECE 627, pp. 1-29.						
	CC	Esterman, Pius, "Feedback Cancellation in Hearing Aids: Results from Using Frequency-Domain Adaptive Filters", Institute for Signal and Information Processing, pp. 257-260.						
	CD	Etter, et al., "Noise Reduction by Noise-Adaptive Spectral Magnitude Expansion", May 1994, J. Audio Eng. Soc., Vol. 42, No. 5, pp. 341-348.						
	CE	George, E. Bryan, "Single-Sensor Speech Enhancement Using a Soft-Decision/Variable Attenuation Algorithm", 1995, IEEE, pp. 816-819.						
	CF	Gustafsson, et al., "A Novel Psychoacoustically Motivated Audio Enhancement Algorithm Preserving Background Noise Characteristics", 1998, IEEE, pp. 397-400.						
Examiner					Date Considered			
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Information Disclosure Statement by Applicant			Applicant: Fang et al.	
(Use several sheets if necessary)			Filed: herewith Group: Unknown	
Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)				
	CG	Kaelin, et al., "A digital Frequency-Domain Implementation of a Very High Gain Hearing Aid with Compensation for Recruitment of Loudness and Acoustic Echo Cancellation", 1998, Elsevier Science B.V., Signal Processing 64, pp. 71-85.		
	CH	Karema, et al., "An Oversampled Sigma-Delta A/D Converter Circuit Using Two-Stage Fourth Order Modulator", 1990, IEEE, pp. 3279-3282.		
	CI	Kates, James M., "Feedback Cancellation in Hearing Aids: Results from a Computer Simulation", 1991, IEEE, Transactions on Signal Processing, Vol. 39, No. 3, pp. 553-562.		
	CJ	Killion, Mead, "The SIN Report: Circuits Haven't Solved the Hearing-in-Noise Problem," October 1997, The Hearing Journal, Vol. 50, No. 20, pp. 28-34.		
	CK	Kuo, et al., "Integrated Frequency-Domain Digital Hearing Aid with the Lapped Transform", Sept. 10, 1992, Northern Illinois University, Department of Electrical Engineering, 2 pages.		
	CL	Lim, et al., "Enhancement and Bandwidth Compression of Noisy Speech", 1979 IEEE, Vol. 67, No. 12, pp. 1586-1604.		
	CM	Maxwell, et al., "Reducing Acoustic Feedback in Hearing Aids", 1995, IEEE, Transactions on Speech and Audio Processing, Vol. 3, No. 4, pp. 304-313.		
	CN	Norsworthy, Steven R., "Delta-Sigma Data Converters", IEEE Circuits & Systems Society, pp. 321-324.		
	CO	Quatieri, et al., "Noise Reduction Based on Spectral Change", MIT Lincoln Laboratory, Lexington, MA, 4 pp.		
	CP	Riley, et al., "High Decimation Digital Filters, 1991, IEEE, pp. 1613-1615.		
	CQ	Sedra, A. S. et al., "Microelectronic Circuits", 1990, Holt Rinehart and Winston, pp. 60-67, 230-241, 900-902.		
	CR	Sheikhzadeh, H., et al., "Comparative Performance of Spectral Subtraction and HMM-Based Speech Enhancement Strategies with Application to Hearing Aid Design," 1994, Proc. IEEE, ICASSP, pp. I-13 to I-17.		
	CS	Siqueira et al., "Subband Adaptive Filtering Applied to Acoustic Feedback Reduction in Hearing Aids", 1997, IEEE, pp. 788-792.		
	CT	Stockham, Thomas G., Jr., "The Application of Generalized Linearity to Automatic Gain Control", June 1968, IEEE, Transactions on Audio and Electroacoustics, Vol. AU-16, NO. 2, pp. 267-270.		
	CU	Virag, Nathalie, "Speech Enhancement Based on Masking Properties of the Auditory System", 1995, IEEE, pp. 796-799.		
	CV	Wyrsh et al., "Adaptive Feedback Cancelling in Subbands for Hearing Aids", 4 pages.		
	CW	Yost, William A., "Fundamentals of Hearing, An Introduction," 1994, Academic Press, Third Edition, p. 307.		
Examiner			Date Considered	
Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.				

Form PTO 1449 (Rev. 2-32) U.S. Department of Commerce Patent and Trademark Office				Atty. Docket No. SNX-036		Serial No. unassigned		
Information Disclosure Statement by Applicant				Applicant: Xiaoling Fang, et al.				
(Use several sheets if necessary)				Filed: herewith		Group: unassigned		
U.S. Patent Documents								
Init.		Document No.	Date	Name	Class	Subclass	Filing Date	
	A	4,122,303	10/24/78	Chaplin et al.				
	B	4,249,128	2/3/81	Karbowski				
	C	4,494,074	1/15/85	Bose				
	D	4,589,133	5/13/86	Swinbanks				
	E	4,630,305	12/16/86	Borth et al.				
	F	4,654,871	3/31/87	Chaplin et al.				
	G	4,878,188	10/31/89	Ziegler, Jr.				
	H	4,953,217	8/28/90	Twiney et al.				
	I	4,985,925	1/15/91	Langberg et al.				
	J	5,105,377	4/14/92	Ziegler, Jr.				
	K	5,177,755	1/5/93	Johnson				
	L	5,251,263	10/5/93	Andrea et al.				
	M	5,452,361	9/19/95	Jones				
	N	5,539,831	7/23/96	Harley				
	O	5,544,250	8/6/96	Urbanski				
	P	5,600,729	2/4/97	Darlington et al.				
	Q	5,848,169	12/8/98	Clark, Jr. et al.				
	R	5,937,070	8/10/99	Todter et al.				
	S	6,035,048	3/7/00	Diethorn				
	T	6,072,884	6/6/00	Kates				
	U	6,118,878	9/12/00	Jones				
	V	6,173,063	1/9/01	Melanson				
	W	6,219,427	4/17/01	Kates et al.				
	X	6,278,786	8/21/01	McIntosh				
	Y	6,396,930	5/28/02	Vaudrey et al.				
Foreign Documents								
							Translation	
Init.		Document No.	Date	Country	Class	Subclass	Yes	No
	Z	WO 98/43567	10/8/98	International				
	AA	WO 99/45741	9/10/99	International				
Examiner					Date Considered			
Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.								